

# Archaeoastronomy of Cromlech-type Constructions and Squaring the Circle

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## Abstract

It is addressed a geometrical model to plan a connection between Cromlech type circles and some square structures found near of such archaeological zones.

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## 1 Geometrical Model

The construction made with compass and straightedge to understand Squaring the Circle given on ref[2]; use a set of basic steps to reach the goal to establish an scheme to define the vector projection that proof the equality between the area of a circle and the area of an square. This steps are proposed taking only some intersections made with compass, like those shown on figure 1. The basic length used to construct such scheme is taking on the arc define between angle 45 (point A) and angle 300 (point B).

Such length can be obtained using a know result of calculus define through an integration over the equation used to define a circle on a Cartesian plane. The result of such procedure establish that every arc length on a circle link with an square of same area that early circle have an approximated value of 101.554. While using a compass this arc length is link with an angle value of 105 and for the vector projection such value is 104.673(7).

The multiples of such values can be used to construct an square of same area that the circle of origin and reach the construction of "*Squaring the Circle*" (points C, D, E, F and G), like is shown on ref[2].

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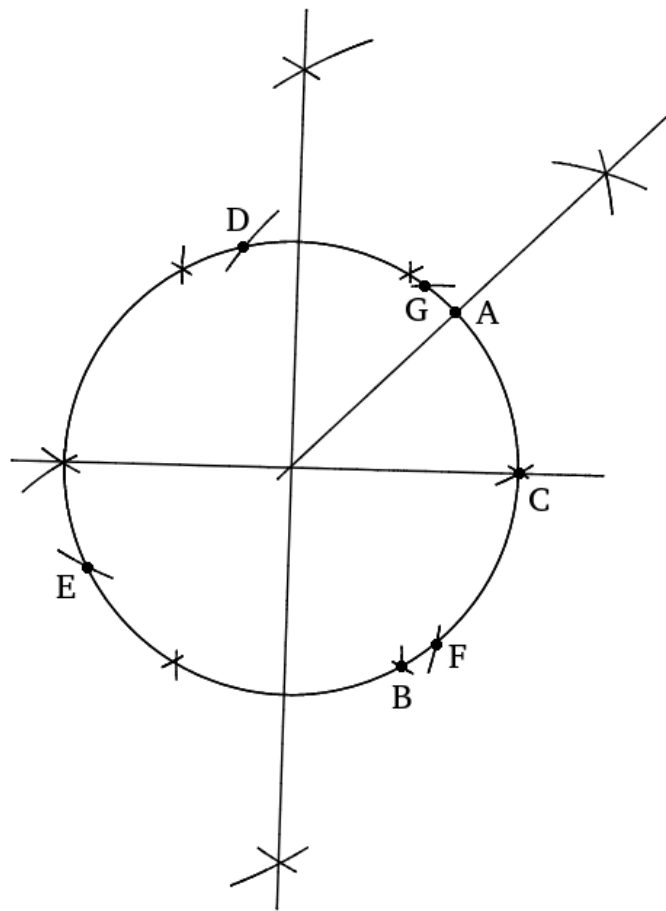


Figure 1: Geometrical model to understand Cromlech construction; made with GeoEnzo online 2024.

Basic construction of Cromlech-type structures is unknown until our days. Some hypothesis postulate that such vestiges were used to establish a date to recognize the begin of a certain weather season; taking like point of reference the output of sun. Nonetheless is interesting to note that the distribution of stones appear to be more complex; like is found on the case of the Cromlech found on Stonehenge.

If some astronomical measure were made using some type of shadow projection over the ground; this could be linked with some type of mathematical procedure used by the epoch. On the other hand is also of interest to mention that some references [3] cite the existence of structure type square near of the zones were such "circles of stones" are settle.

The connection between such geometrical elements (circle and squares) and astronomical events (equinox and sky chart) suggest that some type of ancient procedure of "Squaring the Circle" were know and used to design the architecture of such place; like is mention on ref[1] to discuss the case of Kukulkan's pyramid on Mexico and its connection with Spring equinox.



Figure 2: Stonehenge site on Google Maps

On figure 3 its show the overlaying of the diagram shown on figure 1. It is important to note that such diagram is not made taking into account any preferential editing that relates position of sun, distribution of stones on Stonehenge's Cromlech and the points show on the geometrical model used.



Figure 3: Stonehenge site on Google Maps

Like in the case of Kukulkan's pyramid mention on ref[1]; is also important to note that if some akin mathematical procedure to that mention on such reference was used; this imply that such ancient cultures could have knew some basic principles about vector projection and integral and differential calculus; like that proposed by Gottfried Leibniz and Issac Newton.

Finally is to mention that use of such similar mathematical procedure by both ancient cultures suggest the existence of a possible knowledge sharing between both regions as well as a possible migration between Great Britain Island and America in particular the Maya region in Mexico being found on architecture vestiges for both areas; aside from other regions were Cromlech type structures were found like Portugal, Spain, Sweden, Denmark, France, India and some regions of Africa like Senegal, Gambia, Ghana, Ethiopia and Algeria.

## 2 References

[1] Diaz, J. R. A. M. (2024). Arqueoastronomy of Kukulkan Pyramid using an Squaring the Circle Construction.

[2] Diaz, J. R. A. M. (2024). Study by Vector Projection of a Construction Made with a Rule and Compass to Understand Squaring the Circle.

[3] Sparavigna, A. C. (2016). Megalithic Quadrangles and the Ancient Astronomy. Available at SSRN 2862330.

### **3 Online resources**

[4] Wikipedia - Cromléch / <https://es.wikipedia.org/wiki/Crómlech>

[5] Google Maps

[6] GeoEnzo online 2024.